

## WHAT IS CLAIMED IS:

- 1 1. An entertainment apparatus which displays a moving picture  
2 on a display screen of a display device, the moving picture  
3 being obtained by photographing an object moving in a virtual  
4 three dimensional field, according to manipulation contents  
5 of a manipulator received via a controller, by the use of  
6 a virtual camera, comprising:  
7       object position calculating means for sequentially  
8 calculating a position and a moving direction of said object  
9 in said three dimensional field; and  
10       camera setup means for determining a setup point of  
11 said virtual camera in said three dimensional field every  
12 time the position and moving direction of said object are  
13 calculated by said object position calculating means, while  
14 taking a setup point of the virtual camera obtained at least  
15 in the last calculation into consideration.
- 1 2. The entertainment apparatus according to claim 1, wherein,  
2       said camera setup means includes means for settling  
3 a camera chasing point at a position higher by a predetermined  
4 value H than a position to the rear of said object from the  
5 position thereof by a distance K, the position being on a

6 line which passes through a newly calculated position of  
 7 said object by said object position calculating means and  
 8 is parallel with a newly calculated moving direction of said  
 9 object, and wherein said camera setup means settles a setup  
 10 point of said virtual camera at a position approaching said  
 11 camera chasing point from the setup point of said virtual  
 12 camera obtained at least in the last calculation.

1 3. The entertainment apparatus according to claim 2,  
 2 wherein said camera setup means settles the setup point  
 3 of the virtual camera at a position approaching said camera  
 4 chasing point from the setup point of said virtual camera  
 5 obtained at least in the last calculation by a distance  $L/M$ ,  
 6 the distance  $L/M$  being obtained by dividing a distance  $L$ ,  
 7 which is between said camera chasing point and said virtual  
 8 camera setup point, obtained at least in the last calculation,  
 9 by a predetermined value  $M$ .

1 4. The entertainment apparatus according to claim 3, wherein,  
 2 said camera setup means sets said distance  $K$  so as to  
 3 be shorter as a moving speed of said object in said three  
 4 dimensional field is increased.

1 5. The entertainment apparatus according to claim 1,  
 2 wherein

3        said camera setup means includes means for settling  
 4        a camera reference point at a position in front of the position  
 5        of the object by a distance J, the position being on a line  
 6        passing through a newly calculated position of said object  
 7        by said object position calculating means, and the line being  
 8        parallel with a newly calculated moving direction of said  
 9        object, and wherein said camera setup means settles a sight  
 10       line direction of the virtual camera so that said virtual  
 11       camera is pointed at said camera reference point.

1       6. The entertainment apparatus according to claim 5, wherein,  
 2              said camera setup means sets said distance J so as to  
 3       be longer as a moving speed of said object in said three  
 4       dimensional field is increased.

1       7. The entertainment apparatus according to claim 1, wherein,  
 2              said camera setup means rotates said virtual camera  
 3       around a sight line direction of said virtual camera as an  
 4       axis in response to a rotation of said object around the  
 5       moving direction as an axis.

1       8. A storage medium storing a program which is read out and  
 2       executed by a computer,  
 3              said program being read out and executed by said  
 4       computer to realize means on said computer, said means

5 displaying a moving picture on a display screen of a display  
6 device connected to the computer, obtained in such a manner  
7 that an object moving in a virtual three dimensional field  
8 according to manipulation contents of a player, which are  
9 received by said computer via a controller connected to said  
10 computer, is photographed by a virtual camera, and

11 said means comprises:

12 object position calculating means for sequentially  
13 calculating a position and a moving direction of said object  
14 in said three dimensional field; and

15 camera setup means for determining a setup point of  
16 said virtual camera in said three dimensional field every  
17 time the position and the moving direction of said object  
18 are calculated by said object position calculating means,  
19 while taking the setup point of said virtual camera obtained  
20 at least in the last calculation into consideration.

1 9. The storage medium storing the program according to claim  
2 8, wherein,

3 said camera setup means includes means for settling  
4 a camera chasing point at a position higher by a predetermined  
5 value H than a position to the rear of said object from the  
6 position thereof by a distance K, the position being on a  
7 line which passes through a newly calculated position of  
8 said object by said object position calculating means and

9 is parallel with a newly calculated moving direction of said  
10 object, and wherein,

11 said camera setup means settles a setup point of the  
12 virtual camera at a position approaching said camera chasing  
13 point from the setup point of said virtual camera obtained  
14 at least in the last calculation.

1 10. The storage medium storing the program according to claim  
2 9, wherein,

3 said camera setup means settles the setup point of the  
4 virtual camera at a position approaching said camera chasing  
5 point from the setup point of said virtual camera obtained  
6 at least in the last calculation by a distance  $L/M$ , the  
7 distance  $L/M$  being obtained by dividing a distance  $L$ , which  
8 is between said camera chasing point and said virtual camera  
9 setup point obtained at least in the last calculation, by  
10 a predetermined value  $M$ .

1 11. The storage medium storing the program according to claim  
2 10, wherein,

3 said camera setup means sets said distance  $K$  so as to  
4 be shorter as a moving speed of said object in said three  
5 dimensional field is increased.

1 12. The storage medium storing the program according to claim

2 8, wherein,

3       said camera setup means includes means for settling  
4 a camera reference point at a position in front of the position  
5 of the object by a distance J, the position being on a line  
6 passing through a newly calculated position of said object  
7 by said object position calculating means, and the line being  
8 parallel with a newly calculated moving direction of said  
9 object, and wherein,

10       said camera setup means settles a sight line direction  
11 of the virtual camera so that said virtual camera is pointed  
12 at said camera reference point.

1 13. The storage medium storing the program according to claim  
2 12, wherein,

3       said camera setup means sets said distance J so as to  
4 be longer as a moving speed of said object in said three  
5 dimensional field is increased.

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1 14. The storage medium storing the program according to claim  
2 8, wherein,

3       said camera setup means rotates said virtual camera  
4 around a sight line direction of said virtual camera as an  
5 axis in response to a rotation of said object around the  
6 moving direction as an axis.

1 15. A program product which is read out and executed by a  
2 computer, said program product being executed by said  
3 computer to realize means on said computer, said means  
4 displaying a moving picture on a display screen of a display  
5 device connected to the computer, obtained in such a manner  
6 that an object moving in a virtual three dimensional field  
7 according to manipulation contents of a player, which are  
8 received by said computer via a controller connected to said  
9 computer, is photographed by a virtual camera, and

10 said means comprise:

11 object position calculating means for sequentially  
12 calculating a position and a moving direction of said object  
13 in said three dimensional field; and

14 camera setup means for determining a setup point of  
15 said virtual camera in said three dimensional field every  
16 time the position and the moving direction of said object  
17 are calculated by said object position calculating means,  
18 while taking the setup point of the virtual camera obtained  
19 at least in the last calculation into consideration.

1 16. An object display method in which a moving picture is  
2 obtained by photographing an object moving in a virtual three  
3 dimensional field by the use of a virtual camera, and  
4 displayed on a display screen of a display device, comprising  
5 the steps of:

6           sequentially calculating a position and a moving  
7   direction of said object in said three dimensional field;  
8   and  
9           determining a setup point of said virtual camera in  
10   said three dimensional field every time the position and  
11   the moving direction of said object are calculated while  
12   taking a setup point of said virtual camera obtained at least  
13   in the last calculation into consideration.

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